Bozeman Solvent Site

Proposed Plan and Final Draft Feasibility Study

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Montana Department of Environmental Quality
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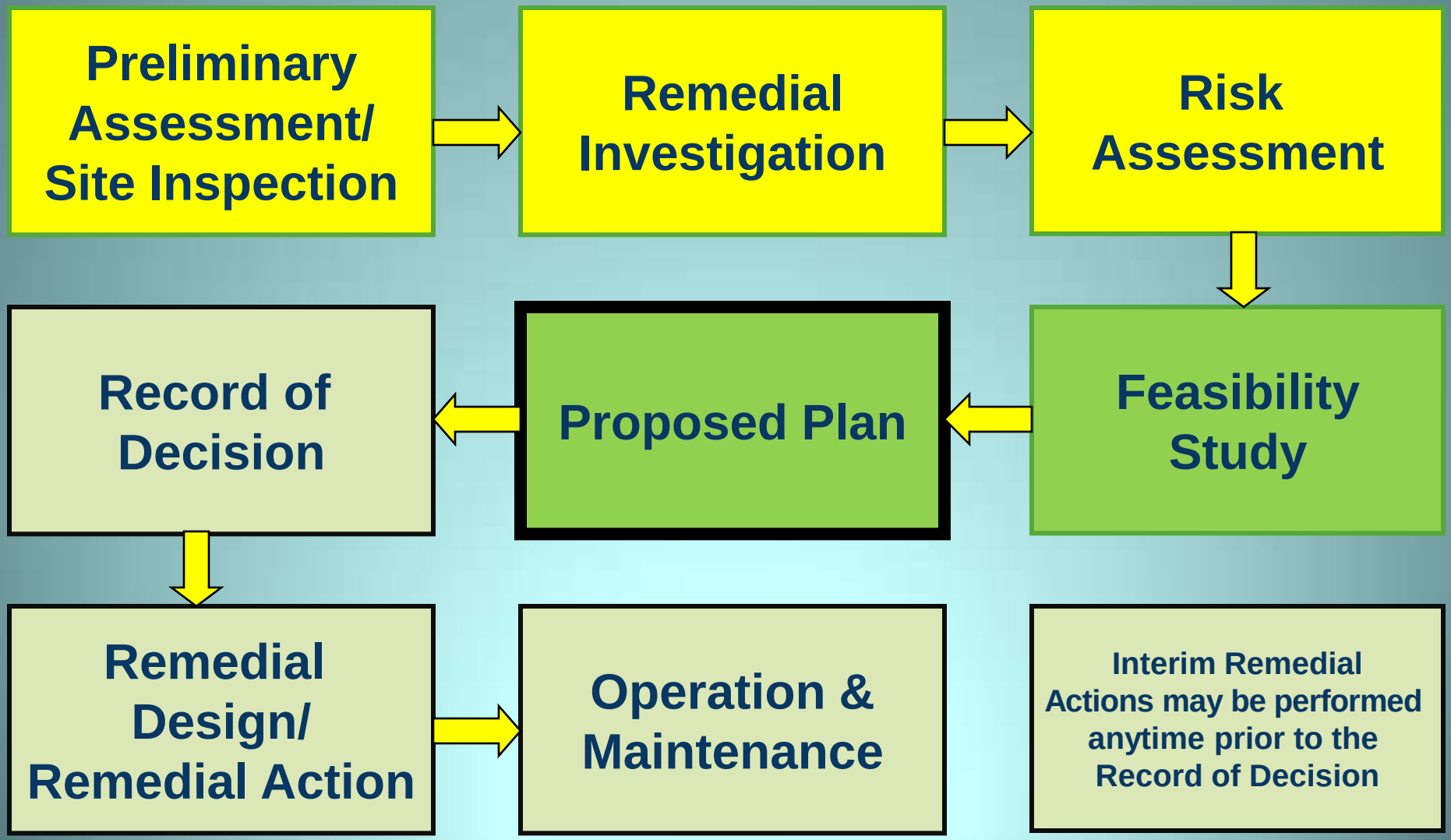
Tonight's Topics

- Superfund Process Overview
- Background
- Interim Remedial Actions
- Risk Assessment
- Cleanup Objectives
- CECRA Criteria

Tonight's Topics

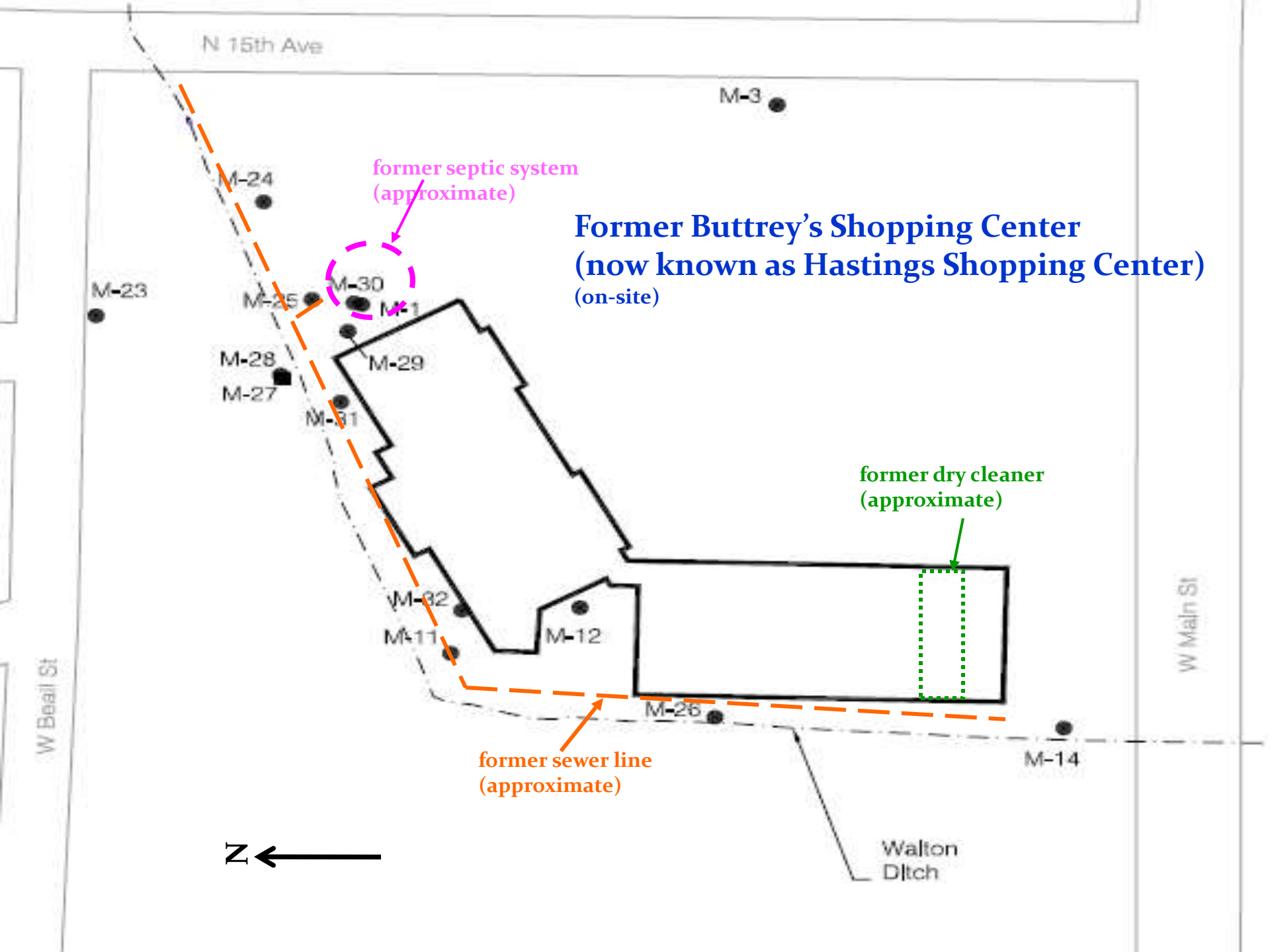
- Cleanup Options Considered
- Preferred Remedy
- Public Comment Period
- Additional Information
- Contact Information

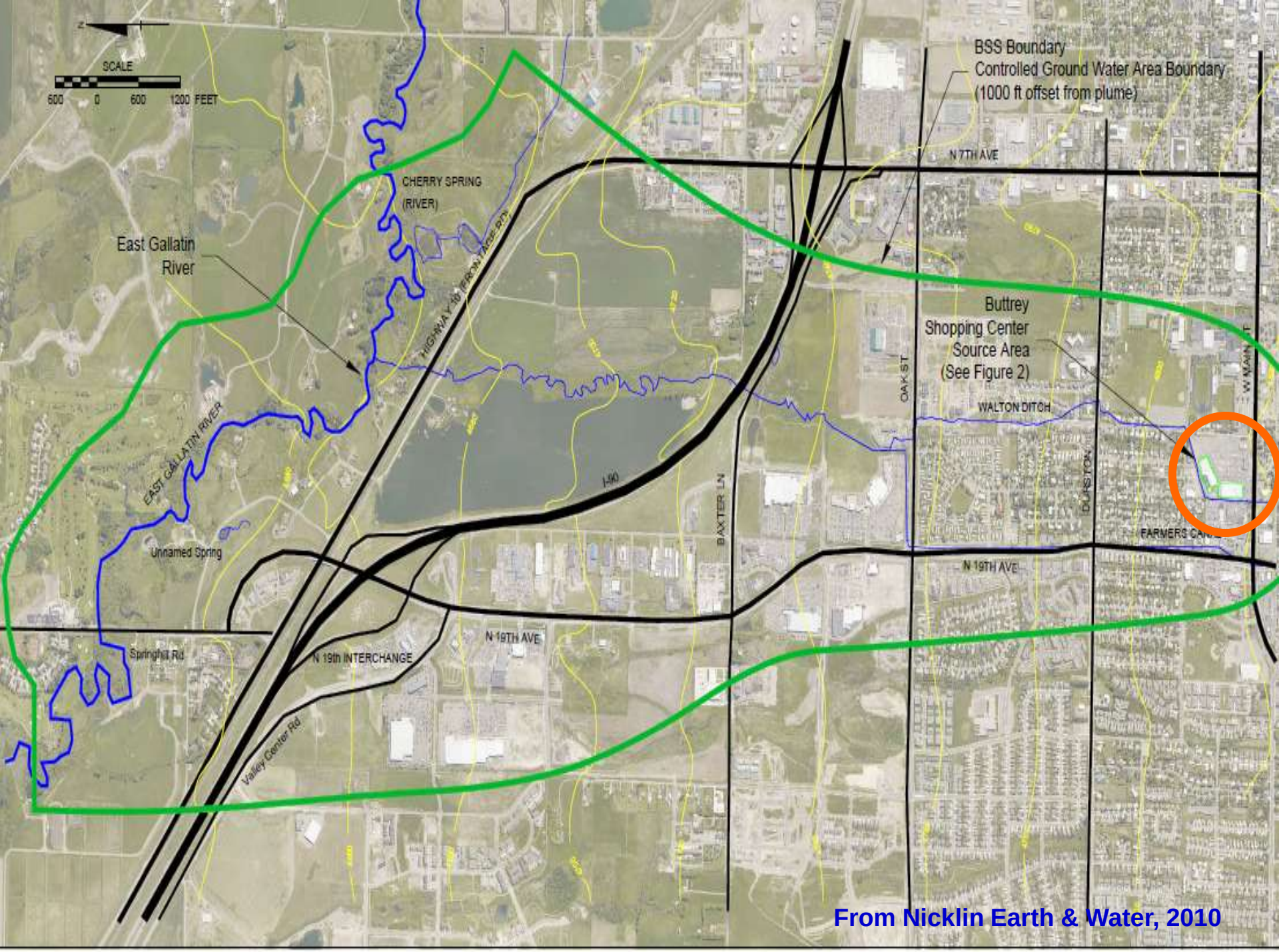
How does the Superfund process work?



Background

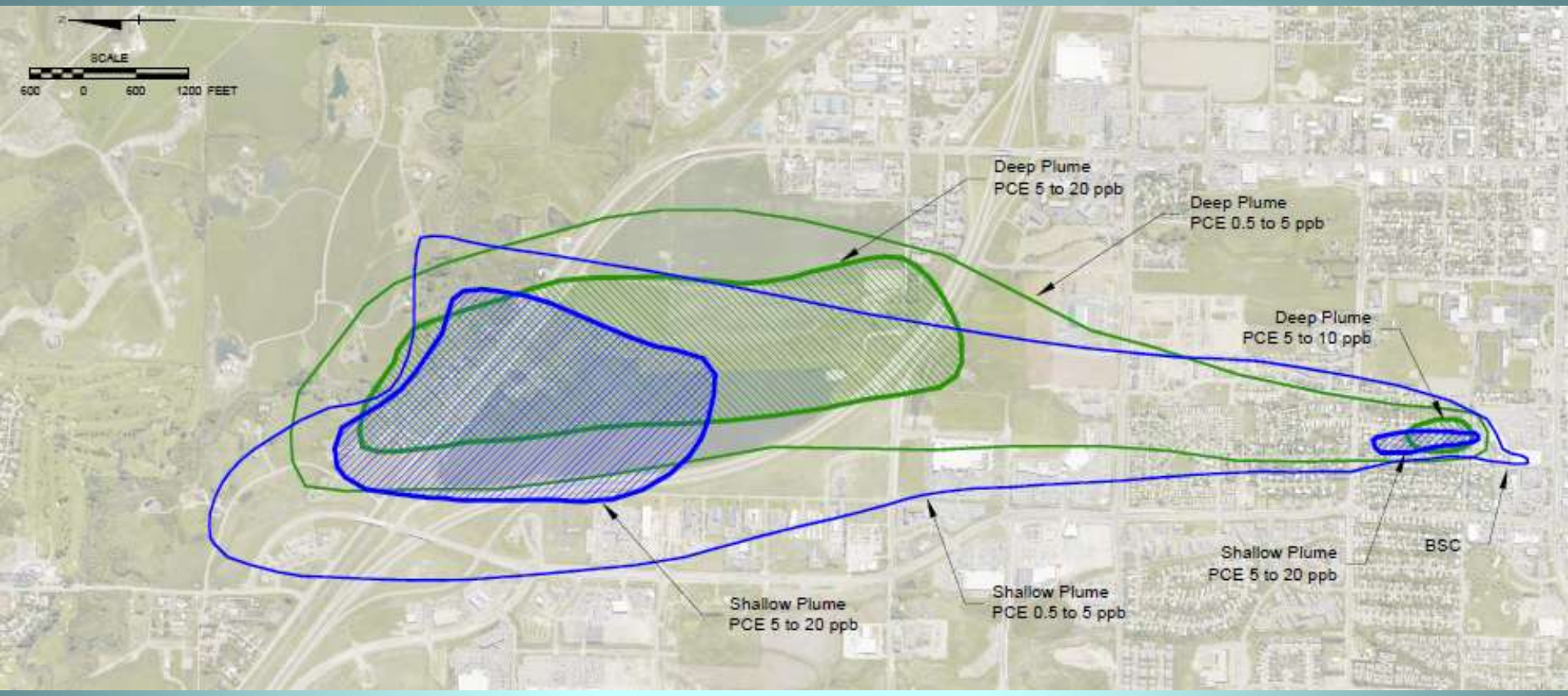
- 1989 tetrachloroethene (PCE) discovered in public water supply well
- Dry cleaner at former Buttrey's Shopping Center released PCE into sewer line and septic system
- Currently PCE groundwater plume extends about 2-½ miles


N 15th Ave
M-3
M-24
former septic system
(approximate)
Former Buttrey's Shopping Center
(now known as Hastings Shopping Center)
(on-site)
M-23
M-25
M-30
M-1
M-28
M-29
M-27
M-31
former dry cleaner
(approximate)
M-32
M-11
M-12
M-26
M-14
former sewer line
(approximate)
W Beail St
W Main St
N
Walton
Ditch



From Nicklin Earth & Water, 2010

PCE in Groundwater



From Nicklin Earth & Water, 2011

Blue – shallow groundwater plume

Green – deep groundwater plume

Interim Remedial Actions

- Sewer line and septic system removed
- Soil vapor extraction (SVE) systems
- Alternate water (connect to City water)
- Controlled groundwater area (CGWA)

Contaminants of Concern (CoCs)

- **Groundwater**
  - ***PCE, trichloroethene (TCE), cis-1,2-dichloroethene (DCE), and vinyl chloride***
- **Subsurface Soil**
  - ***PCE, TCE, and DCE***
- **Soil Vapor**
  - ***PCE, TCE, vinyl chloride, and methane***
- **Indoor Air**
  - ***PCE***

Risk Assessment

What is causing the risk?

- ***Skin contact with contaminated soil or groundwater***
- ***Ingestion of contaminated soil or groundwater***
- ***Inhalation of contaminated soil vapor***

Risk Assessment

Who/What is at risk? (current & future)

- ***On-site utility & construction workers***
- ***Off-site construction workers***
- ***On-site workers & visitors***
- ***Off-site workers & residents***
- ***Groundwater (potential leaching from soil contamination)***

Risk Assessment

How Great is the Risk?

- ***Cancer Risk – DEQ allowable limit***

  1×10^{-5} or 1 in 100,000 or 0.001%

- ***Non-cancer Risk – DEQ allowable limit***

  Hazard Index is 1.0 or less

Site Specific Cleanup Levels (SSCLs)

Groundwater (micrograms per liter – ug/L)

COC	DEQ-7 Standard	Federal Maximum Contaminant Level
PCE	5	5
TCE	5	5
DCE	70	70
Vinyl chloride	0.2	2

Subsurface Soil (milligrams per kilogram – mg/kg)

COC	Cleanup Level for the Protection of Groundwater
PCE	0.19
TCE	0.087
DCE	0.57

Site Specific Cleanup Levels (SSCLs)

Soil Vapor (micrograms per cubic meter – ug/m^3) *(not sub-slab soil vapor)*

COC	On-site Utility Worker	On-site Construction Worker	Off-site Construction Worker
PCE	7,000	340	1,000
TCE	16,000	990	NA
Vinyl chloride	16,000	450	NA
Methane (parts per million by volume – ppm)		12,500 ppm	

(Methane SSCL based on 25% of lower explosive level of 50,000 ppm)

Indoor Air (ug/m^3)

COC	Commercial Cleanup Level	Residential Cleanup Level
PCE	22.3	4.4

Cleanup Objectives

- **For Groundwater**
  - ***Meet groundwater cleanup levels for COCs.***
  - ***Comply with ERCLs for COCs.***
  - ***Reduce potential future migration of contaminated groundwater plume.***
  - ***Prevent exposure of humans to COCs in groundwater at concentrations above cleanup levels.***

Cleanup Objectives

- **For Subsurface Soil**
  - ***Meet soil cleanup levels for COCs.***
  - ***Prevent migration of COCs that would potentially leach from soil to groundwater.***
- **For Soil Vapor**
  - ***Meet soil vapor cleanup levels for COCs.***
  - ***Prevent exposure of humans to COCs in soil vapor at concentrations above cleanup levels.***

Cleanup Objectives

- **For On-Site Sub-slab Soil Vapor**
  - ***Reduce the potential for sub-slab soil vapors to move upward and impact indoor air at concentrations greater than the cleanup level in the BSC building.***
- **For Indoor Air**
  - ***Prevent exposure of humans to COCs in indoor air at concentrations above cleanup levels.***

Seven CECRA Criteria

1. Protect public health, safety and welfare and the environment;
2. Comply with ERCLs;
3. Mitigate exposure of risks to public health, safety and welfare and the environment;
4. Be effective and reliable in the short- and long-term;

Seven CECRA Criteria

5. Be practicable and implementable;
6. Use treatment and/or resource recovery technologies, if practicable, giving due consideration to engineering controls; and
7. Be cost-effective.

Cleanup Options Considered

Common Elements

Institutional Controls

- Land Use Controls
- Groundwater Use Restrictions
- Permitting Requirements

City Water Connections (south side of river)

Long-term Monitoring (monitoring wells and drinking water wells)

Cleanup Options Considered

Alternative 1

No Action

Cost: $0

Cleanup Options Considered

Alternative 2

(on-site residual source)

In Situ Enhanced Biodegradation

(the breakdown of contamination by enhancing the naturally-occurring organisms present in soil and groundwater)

Cost: $3,547,330

Cleanup Options Considered

Alternative 3

(on-site residual source)

In Situ Chemical Oxidation

(the treatment of contaminated groundwater and soil through the injection of a chemical oxidant into the groundwater)

Cost: $3,463,974

Cleanup Options Considered

Alternative 4

(on-site residual source)

Air Sparging

(the injection of air into the groundwater to volatilize contaminants into the overlying soil and then the extraction of contaminant vapor from the overlying soils)

Cost: $3,252,831

Cleanup Options Considered

Alternative 5

(on-site residual source)

Hydraulic Control/Containment

(the extraction and treatment of contaminated groundwater and re-injection of treated groundwater to minimize the movement of contaminated groundwater away from the residual source area)

Cost: $3,074,905

Cleanup Options Considered

Alternative 6

(sub-slab soil vapor)

Passive Soil Venting

(the removal and discharge of contaminated soil vapor to the atmosphere using natural gradients between the subsurface and atmosphere or renewable energy, such as wind or sun)

Cost: $615,490

Cleanup Options Considered

Alternative 7

(sub-slab soil vapor)

Soil Vapor Extraction

(the removal and discharge, after treatment, to the atmosphere of contaminated soil vapor by extracting vapors using a vacuum)

Cost: $545,997

Cleanup Options Considered

Alternative 8

(alternate drinking water)

New or Deeper Replacement Wells

(drinking water wells north of East Gallatin River would be replaced with new or deeper wells if existing wells are contaminated with PCE concentrations greater than the MCL)

Cost: $329,418

Cleanup Options Considered

Alternative 9

(alternate drinking water)

Point-of-Use (POU) Treatment Systems

(drinking water wells north of East Gallatin River would temporarily be treated with POU treatment systems if existing wells are contaminated with PCE concentrations greater than the MCL)

Cost: $702,590

Cleanup Options Considered

Alternative 10

(alternate drinking water)

Connection to City Water

(drinking water wells north of East Gallatin River that are contaminated with PCE concentrations greater than the MCL would be replaced with connection to City water services)

Cost: $3,935,388

Cleanup Options Considered

Alternative 11

(alternate drinking water)

New Community Water System

(drinking water wells north of East Gallatin River that are contaminated with PCE concentrations greater than the MCL would be replaced with a new community water system that is different than City water services)

Cost: $1,761,349

Cleanup Options Considered

Alternative 12

(off-site dissolved groundwater plume)

Plume Migration Pump and Treat

(the extraction and treatment of contaminated groundwater and re-injection of treated groundwater to minimize the movement of contaminated groundwater north of the East Gallatin River)

Cost: $6,250,073

Cleanup Options Considered

Alternative 13

(off-site dissolved groundwater plume)

Plume Remediation Pump and Treat

(the extraction and treatment of contaminated groundwater and re-injection of treated groundwater to minimize the movement of contaminated groundwater north of the East Gallatin River)

Cost: $7,229,604

Cleanup Options Considered

Alternative 14

(off-site dissolved groundwater plume)

Monitored Natural Attenuation

(using natural processes, along with source removal, to reduce contaminant concentrations in off-site groundwater)

Cost: $793,013

Comparison to CECRA Criteria

- None of the cleanup options meet all of the CECRA criteria alone.

- All would meet the CECRA criteria if combined with other cleanup options.

Preferred Remedy

- Common Elements
- Alternative 2 In Situ Enhanced Bioremediation
- Alternative 7 Soil Vapor Extraction
- Alternative 8 New or Deeper Replacement Wells
- Alternative 14 Monitored Natural Attenuation

Total Estimated Cost:

$5,876,249

Preferred Remedy

- Meets all CECRA criteria
- Expected to achieve substantial and long-term risk reduction
- Provides measures to prevent future exposures to contaminated groundwater and soil vapor
- Attains the highest level of risk reduction compared to cost
- Provides for long-term reliability of remedy

Public Comment Period

February 28, 2011

through

March 29, 2011 (11:59 p.m.)

Accepting verbal comments tonight.

Additional Information

- DEQ offices: 1100 North Last Chance Gulch, Helena, MT
- Bozeman City Library: 626 E. Main St., Bozeman, MT
- DEQ's website for the Bozeman Solvent Site: http://deq.mt.gov/StateSuperfund/bozeman_solvent.mcpx

Contact Information

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